

CLAIMS

[1] A pipeline closing apparatus comprising:

5 a lid member attachable to a downstream end portion of a sluice valve or an end portion of a pipe portion connected thereto for closing an end opening of a branch pipe connected to and diverging from a fluid transmitting main and having the sluice valve disposed therein;

a cylindrical first control shaft extending through the lid member to be axially slidable in sealed condition;

10 a second control shaft extending through the first control shaft to be axially slidable;

a first pressing plate attached to an inward end region of the first control shaft;

15 a second pressing plate attached to an inward end region of the second control shaft upstream of the first pressing plate;

20 an elastic annular member disposed between the first pressing plate and the second pressing plate and elastically deformable to a diameter-increased position for tight contact with an inner peripheral surface of the branch pipe by being clamped and pressed between both of the pressing plates from axial directions, thereby to block between the inner peripheral surface and outer peripheral portions of the pressing plates; and

25 a retaining device provided between the inward end region of the second control shaft and the second pressing plate, and including engaging link pairs flexing and bulging to a diameter-increased position to engage with positions upstream of a position blocked by the elastic annular member in response to outward sliding movement of the second control shaft relative to the first control shaft;

30 wherein a reversal preventing device is provided which, when the engaging link pairs of the retaining device are stretched to a diameter-reduced position, contacts and limits the engaging link pairs to an

outwardly bent position where flexing pivotal portions of the engaging link pairs project radially outward.

[2] A pipeline closing apparatus as defined in Claim 1, wherein the reversal preventing device includes a tubular elastic correcting member mounted on the inward end region of the second control shaft for contacting at least one of the engaging links when the engaging link pairs stretched to the diameter-reduced position reach a predetermined outwardly bent position.

[3] A pipeline closing apparatus as defined in Claim 1, wherein the reversal preventing device includes a ring-shaped elastic correcting member for contacting one of the engaging links when the engaging link pairs stretched to the diameter-reduced position reach the predetermined outwardly bent position, the elastic correcting member being mounted on a mounting tubular member fitted on the inward end region of the second control shaft and having a connecting element pivotably connected to an end portion of one of the engaging links.

[4] A pipeline closing apparatus as defined in any one of Claims 1 to 3, wherein the elastic annular member is shaped cylindrical and has an axially middle portion larger in diameter than axially opposite end portions.

[5] A pipeline closing apparatus as defined in Claim 4, wherein the axially middle portion of the elastic annular member has an outer peripheral surface which is shaped partly spherical to project most outwardly at an axial middle part thereof.

[6] A pipeline closing apparatus as defined in any one of Claims 1 to 3, wherein both of the pressing plates include annular holding portions to be

in contact with outer circumferential surfaces of the axially opposite end portions of the cylindrical elastic annular member.

[7] A pipeline closing apparatus as defined in Claim 5, wherein the
5 large diameter middle portion of the elastic annular member has an inner peripheral surface that is shaped partly spherical to project most outwardly at an axially middle part thereof.

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